Contribution ID: **767** Type: **Poster (+) Presentation**

Separation of colloidal particles in microchannels using diffusiophoresis

Wednesday, 2 June 2021 16:00 (1 hour)

Flows containing suspended colloidal particles and dissolved solutes can occur in a variety of natural and engineered scenarios. With an objective of designing technological applications including effective separation techniques, it is desirable to gain control over the particle dynamics. Diffusiophoresis or the chemotactic migration of colloidal particles due to local chemical gradients was first demonstrated by Derjaguin in the 1940s and later developed by Anderson & Prieve in the 1980s. In the recent years, this mechanism has received a renewed interest for achieving rapid focusing and trapping of particles. Following this motivation, we numerically study the combined effect of fluid advection and particle diffusiophoresis driven by a local solute concentration gradient to achieve controlled trapping of the suspended colloidal particles in microchannels. More precisely, we vary the size and surface charge of the particles to show that size-dependent and surface-charge-dependent particle separation can be achieved rapidly in dilute solutions by imposing a solute gradient. We also investigate a related phenomenon referred to as diffusioosmosis that causes bulk flow adjacent to a stationary surface, by varying the surface charge of the microchannel geometry.

Time Block Preference

Time Block A (09:00-12:00 CET)

References

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